

Records of Encyrtidae (Hymenoptera: Chalcidoidea) parasitoids on mealybugs (Hemiptera: Pseudococcidae) from Tamil Nadu, India

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ABSTRACT: Twenty nine species of encyrtids are recorded from the survey conducted during 2008-2010. The encyrtids were reared from mealybugs collected in various districts of Tamil Nadu. Of the 29 species listed here, 11 species are new distributional records for Tamil Nadu and for 27 species new host records are reported for India. *Rhopus nigroclavatus* is a previously recorded species from Tamil Nadu.

In recent years mealybugs have become serious pests globally (Khaskheli, 2006) including many States in India causing severe damage to many crops (Suresh and Kavitha, personal communication; Suresh *et al.*, 2010; Tanwar *et al.*, 2007; Vennila, 2008; Nagrare *et al.*, 2009). Noyes and Hayat (1994) recorded 49 encyrtid species as parasitoids of mealybugs in India, of which 27 species were from Tamil Nadu. Hayat (2006) recorded 499 and 141 species of encyrtids from India and Tamil Nadu respectively and among them only 62 (India) and 39 (Tamil Nadu) species are reported from mealybugs. So to further understand the encyrtid - mealybug association, mealybugs from different agro ecosystem were explored in various districts of Tamil Nadu. The results of this investigation are presented in this paper.

Not all the encyrtids recorded here are primary parasitoids of mealybugs, species of *Cheiloneurus* and *Prochiloneurus* are secondary/hyperparasitoids parasitizing primary parasitoids, and *Homalotylus* species are primary parasitoids of larvae and prepupae of coccinellid beetles (Coleoptera) feeding on mealybugs. Hyperparasitoids are denoted by an asterisk (*).

A survey was initiated in January, 2008 for two years in various districts of Tamil Nadu in search of potential natural enemies especially encyrtids to enhance biological control programme against mealybugs. Mealybug infested plant parts were collected and kept in jars and reared in the laboratory to observe for emergence of parasitoids. The recovered parasitoids were then dry mounted on rectangles and labelled according to the standard procedure provided by Noyes (1982). References to all the species recorded here are available in Noyes and Hayat (1994) and Hayat (2006 and 2009). All parasitoids mentioned below were identified using the keys of Hayat (2006 and 2009) and Noyes and Hayat (1994) and deposited with Parasitoid Taxonomy and Biocontrol Laboratory, Department of Entomology, Faculty of Agriculture, Annamalai University, Annamalainagar.

1. *Adelencyrtus coxalis* Hayat, Alam and Agarwal

Specimens examined: India: Tamil Nadu, Cuddalore, Therkumangudi (11°20' N 79°44' E, 6.5m), 1 female, 1.viii.2009, ex. *Brevennia rehi* (Lindinger) on *Oryza sativa*, coll. T. Nalini.

Distribution: India: Andra Pradesh (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from *Brevennia rehi* on *Oryza sativa* (present record for India).

2. *Aenasius advena* Compere

Specimens examined: India: Tamil Nadu, Dharmapuri, Hogenakkal (11°19' N 77°40' E, 1523 m), 8 females, 10.i.2010, ex. *Ferrisia virgata* (Cockerell) on *Leucaena leucocephala*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 12 females, 5.x.2009, ex. *Ferrisia virgata* on *Nerium indicum*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 2 females, 25.vii.2009, ex. *Ferrisia virgata* on *Pongamia pinnata*, coll. T. Nalini; Salem, Salem (11°65' N 78°17' E, 273 m), 5 females, 14.xii.2009, ex. *Phenacoccus solenopsis* Tinsley on *Hibiscus rosa-sinensis* and *Abutilon indicum*, coll. A. Rameshkumar.

Distribution: India: Andaman and Nicobar islands, Delhi, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttaranchal, Uttar Pradesh. (Bangladesh; Pakistan; Hawaii Is.; Malaysia; Philippines; Solomon Is.; New Caledonia; Samoa; Fiji; Loyalty Is.; widely distributed, nearly cosmopolitan in the old world tropics, and also from the Neotropical region) (Hayat, 2006).

Hosts: Recorded here from *Ferrisia virgata* on *Leucaena leucocephala*, *Nerium indicum* and *Pongamia pinnata* (present record for India) and from *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis* and *Abutilon indicum*.

3. *Aenasius bambawalei* Hayat

Specimens examined: India: Tamil Nadu, Cuddalore,

Annamalainagar (11°24' N 79°44' E, +5.79 m), 27 females, 2.iv.2008, ex. *Phenacoccus solenopsis* on *Cyamopsis tetragonolobus*, *Lycopersicon esculentum*, *Abelmoschus esculentus*, *Hibiscus rosa-sinensis*, *Hibiscus cannabinus*, *Legenaria siceraria*, *Solanum melongena*, *Amaranthus tricolor*, *Datura stramonium*, *Helianthus annuus* and *Gossypium hirsutum*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 3 females, 2.v.2009, ex. *Pseudococcus longispinus* (Targioni-Tozzetti) on *Cyanodon dactylon*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 23 females, 2.iii.2010, ex. *Phenacoccus solenopsis* on *Cyamopsis tetragonolobus*, *Lycopersicon esculentum*, *Abelmoschus esculentus*, *Hibiscus rosa-sinensis*, *Hibiscus cannabinus*, *Legenaria siceraria*, *Solanum melongena*, *Amaranthus tricolor*, *Datura stramonium*, *Helianthus annuus* and *Gossypium hirsutum*, coll. T. Nalini; Virudhunagar, Aruppukottai (9°52' N 78°10' E, 95.4m), 3 females and 1 male, 1.x.2009, ex. *Phenacoccus solenopsis* on *Lycopersicon esculentum*, coll. T. Nalini; Madurai, Thirumangalam (9°83' N 77°98' E, 124.8m), 2 females, 7.x.2009, ex. *Phenacoccus solenopsis* on *Lycopersicon esculentum*, coll. T. Nalini; Kanyakumari, Aaravaimozhi (8°08' N 77°55' E, 0 m), 2 females, 2.viii.2009, ex. *Phenacoccus solenopsis* on *Lycopersicon esculentum*, coll. S. Manickavasagam; Cuddalore, Vellapakkam (9°52' N 78°10' E, 95.4m), 1 female, 16.ix.2009, ex. *Phenacoccus solenopsis* on *Lycopersicon esculentum*, coll. T. Nalini; Coimbatore, Mettupalayam (11°30' N 79°95' E, 310m), 5 females, 2.iv.2009, ex. *Phenacoccus solenopsis* on *Abutilon indicum* and *Legenaria siceraria*, coll. S. Manickavasagam; Dindugal, Kavarayanpatti (10°05' N 77°30' E, (+) 280.11m), 1 female, 6.iv.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. S. Manickavasagam; Perambalur, Chettikulam (10°09' N 77°07' E, 328.5 m), 1 female, 2.iii.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. S. Manickavasagam; Salem, Attur (11°60' N 78°62' E, 208.5m), 1 female, 24.iii.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. S. Manickavasagam; Trichy, Perumalpalayam (11°30' N 77°45' E, 79.5 m), 3 females, 12.vi.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. S. Manickavasagam; Pudukkottai, Pullanviduthi (10°38' N 78°82' E, 98.4m), 11 females, 8.viii.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. T. Nalini; Tirunelveli, Kaval kinaru (8°8' N 77°09' E, 46.2 m), 3 females, 2.viii.2009, ex. *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. S. Manickavasagam. **Distribution:** India: Delhi, Haryana, Maharashtra (Hayat, 2006), Tamil Nadu (present record). **Hosts:** Recorded here from *Phenacoccus solenopsis* on *Cyamopsis tetragonolobus*, *Lycopersicon esculentum*, *Abelmoschus esculentus*, *Hibiscus rosa-sinensis*, *Hibiscus cannabinus*, *Legenaria siceraria*, *Solanum melongena*, *Amaranthus tricolor*, *Datura stramonium* and *Helianthus annuus* (present record for India) and from *Pseudococcus longispinus* on *Cyanodon dactylon*; Recorded here from *Phenacoccus solenopsis* on *Gossypium hirsutum* and *Abutilon indicum* (present record for Tamil Nadu).

4. *Aenasius indicus* (Narayanan and Subba Rao)

Specimens examined: India: Tamil Nadu, Nagapatinam, Tranquebar (11°03' N 79°85' E, 0.9 m), 14 females and 4

males, 10.ii.2010, ex. *Ferrisia virgata* on indet. ornamental plant, coll. A. Rameshkumar.

Distribution: India: Delhi, Himachal Pradesh, Kerala, Madhya Pradesh, Orissa, Punjab, Uttaranchal, Uttar Pradesh. (Pakistan) (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from *Ferrisia virgata* on indet. ornamental plant (present record for India).

5. *Alamella flava* Agarwal

Specimens examined: India: Tamil Nadu, Trichy, Erakudi (11°30' N 78°50' E, 78 m), 2 females, 21.vii.2009, ex. *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. A. Rameshkumar.

Distribution: India: Andhra Pradesh, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh. (Angola; Namibia; South Africa; Madagascar; Pakistan) (Hayat, 2006).

Hosts: Recorded here from *Phenacoccus solenopsis* on *Gossypium hirsutum* (present record for India).

6. *Anagyrus chrysos* Noyes and Hayat

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 2 females, 2.vii.2009, ex. *Maconellicoccus hirsutus* (Green) on *Abelmoschus esculentus*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 1 female, 7.vii.2009, ex. *Planococcus citri* (Risso) on *Cyamopsis tetragonolobus*, coll. T. Nalini; Dindugal, Bathalagundu (10°09' N 78°20' E, +280.11 m), 1 female, 6.iv.2009, ex. *Phenacoccus solenopsis* on *Lycopersicon esculentum*, coll. S. Manickavasagam.

Distribution: India: Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh. (Malaysia) (Hayat, 2006).

Hosts: Recorded here from *Maconellicoccus hirsutus* on *Abelmoschus esculentus* (present record for India) and from *Planococcus citri* on *C. tetragonolobus* and from *Phenacoccus solenopsis* on *Lycopersicon esculentum*.

7. *Anagyrus dactylopii* (Howard)

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 8 females and 32 males, 15.vii.2009, ex. *Maconellicoccus hirsutus* on *Gossypium hirsutum* and *Abelmoschus esculentus*, coll. T. Nalini; Coimbatore, Mettupalayam (11°30' N 76°95' E, 310m), 3 females, 2.xii.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis* and *Vitis vinifera*, coll. S. Manickavasagam; Trichy, Erakudi (11°30' N 78°50' E, 78 m), 4 females, 21.v.2009, ex. *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. A. Rameshkumar.

Distribution: India: Andaman and Nicobar islands, Andhra Pradesh, Bihar, Delhi, Goa, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttaranchal, Uttar Pradesh. (Oman; Iran; Iraq; Hong Kong; Thailand; China; Indonesia: Java; Hawaii) (Hayat, 2006).

Hosts: Recorded here from *Maconellicoccus hirsutus* on *Gossypium hirsutum* and *Abelmoschus esculentus* (present record for India) and from *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, *Vitis vinifera* and *Gossypium hirsutum*.

8. *Anagyrus gracilis* (Hayat)

Specimens examined: India: Tamil Nadu, Cuddalore, Therkumangudi (11°20' N 79°44' E, 6.5m), 5 females, 1.viii.2009, ex. *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini; Nagapatinam, Kunnam (11°31' N 79°73' E, 13m), 11 females, 24.vii.2009, ex. *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini.

Distribution: India: Andaman and Nicobar islands, Andhra Pradesh, Assam, Delhi, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Rajasthan, Tamil Nadu, Uttar Pradesh. (Madagascar; Nepal) (Hayat, 2006).

Hosts: Recorded here from *Brevennia rehi* on *Oryza sativa* (present record for India).

9. *Anagyrus indicus* (Subba Rao)

Specimens examined: India: Tamil Nadu, Salem, Attur (11°60' N 78°62' E, 208.5m), 13 females, 10.iii.2009, ex. *Ferrisia virgata* on *Psidium guajava*, coll. A. Rameshkumar; Dharmapuri, Illakampatti (12°13' N 78°17' E, 460.5 m), 7 females, 15.v.2010, ex. *Ferrisia virgata* on *Psidium guajava*, coll. A. Rameshkumar.

Distribution: India: Andhra Pradesh, Delhi, Karnataka, Kerala, Maharashtra, Punjab, Uttar Pradesh, West Bengal. (Saudi Arabia) (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from *Ferrisia virgata* on *Psidium guajava* (Subba Rao, 1967; Hayat *et al.*, 1975).

10. *Anagyrus kamali* Moursi

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar, (11°24' N 79°44' E, +5.79 m), 5 females, 5.vii.2008, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, *Gossypium hirsutum* and *Hibiscus mutabilis*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 15 females and 23 males, 15.vii.2009, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, *Gossypium hirsutum* and *Hibiscus mutabilis*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 1 female, 5.iv.2010, ex. *Maconellicoccus hirsutus* on *Hibiscus rosa-sinensis*, coll. T. Nalini.

Distribution: India: Delhi, Karnataka, Maharashtra, Tamil Nadu, Uttaranchal, Uttar Pradesh. (Egypt; Jordan; Pakistan; Sri Lanka; China; Indonesia: Java) (Hayat, 2006).

Hosts: Recorded here from *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, *Gossypium hirsutum* and *Hibiscus mutabilis* (present record for India) and from *Maconellicoccus hirsutus* on *Hibiscus rosa-sinensis*.

11. *Anagyrus mirzai* Agarwal and Alam

Specimens examined: India: Tamil Nadu, Cuddalore, Sivapuri (11°24' N 79°41' E, 5.79m), 2 females, 2.i.2010, ex. *Phenacoccus solenopsis* on *Hibiscus cannabinus*, coll. T. Nalini.

Distribution: India: Andaman and Nicobar islands, Andhra Pradesh, Delhi, Haryana, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh. (Jordan; Pakistan) (Hayat, 2006).

Hosts: Recorded here from *Phenacoccus solenopsis* on *Hibiscus cannabinus* (present record for India).

12. *Blepyrus insularis* (Cameron)

Specimens examined: India: Tamil Nadu, Dharmapuri, Hogenakkal (11°19' N 77°40' E, 1523 m), 8 females,

10.i.2010, ex. *Ferrisia virgata* on *Leucaena leucocephala*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 2 females, 5.ii.2010, ex. *Ferrisia virgata* on *Abelmoschus moschatus*, coll. T. Nalini; Pudukkottai, Pullanviduthi (10°38' N 78°82' E, 98.4 m), 7 females, 25.vi.08, ex. *Coccidohistrix insolita* (Green) on *Solanum torvum*, coll. T. Nalini; Coimbatore, Mettupalayam (11°30' N 76°95' E, 310m), 1 female, 2.iv.2009, ex. *Phenacoccus solenopsis* on *Datura stramonium*, coll. S. Manickavasagam; Salem, Salem (11°65' N 78°17' E, 273 m), 1 female, 14.xii.2009, ex. *Phenacoccus solenopsis* on *Abutilon indicum*, coll. S. Manickavasagam; Trichy, Perumalpalayam (11°30' N 77°45' E, 79.5 m), 3 females, 2.ix.2009, ex. *Phenacoccus solenopsis* on *Abutilon indicum*, coll. S. Manickavasagam.

Distribution: India: Delhi, Goa, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttaranchal, Uttar Pradesh, West Bengal. (Sri Lanka; Malaysia; Sarawak; Papua New Guinea; Mariana Is.; Hawaii Is.; Nigeria) (Hayat, 2006).

Hosts: Recorded here from *Ferrisia virgata* on *Leucaena leucocephala* and *Abelmoschus moschatus* (present record for India) and from *Coccidohistrix* [= *Centrococcus*] *insolita* on *Solanum torvum* and from *Phenacoccus solenopsis* on *Datura stramonium* and *Abutilon indicum*.

13. **Cheiloneurus basiri* Hayat, Alam and Agarwal

Specimens examined: India: Tamil Nadu, Cuddalore, Chidambaram (11°40' N 79°70' E, 2.7 m), 2 females, 1.ii.2010, ex. *Rastrococcus iceryoides* (Green) on *Pongamia pinnata* via *Neoplatycerus tachikawai*, coll. A. Rameshkumar.

Distribution: India: Goa, Karnataka, Kerala (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from *Rastrococcus iceryoides* on *Pongamia pinnata* via *Neoplatycerus tachikawai* (present record for India).

14. **Cheiloneurus quadricolor* (Girault)

Specimens examined: India: Tamil Nadu, Cuddalore, Therkumangudi (11°20' N 79°44' E, 6.5m), 2 females, 1.viii.2009, ex. (with) *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini.

Distribution: India: Andaman and Nicobar islands, Andhra Pradesh, Delhi, Himachal Pradesh, Karnataka, Kerala, Maharashtra, Rajasthan, Tamil Nadu, Uttaranchal, Uttar Pradesh. (Afghanistan; Australia; Pakistan; Russia; Turkmenia; Tadzhikistan; Egypt) (Hayat, 2006).

Hosts: Recorded here (with) *Brevennia rehi* on *Oryza sativa* (present record for India).

15. *Gyranusoidea flava* Shafee, Alam and Agarwal

Specimens examined: India: Tamil Nadu, Vellore, Kalavai (12°77' N 79°42' E, 135.6 m), 3 females, 1.v.2010, ex. indet. mealybug on *Mangifera indica*, coll. T. Nalini; Theni, Pudupatti (11°15' N 78°22' E, 149.4 m), 1 female, 2.ix.2009, ex. indet. mealybug on *Anona squamosa*, coll. S. Manickavasagam.

Distribution: India: Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Uttaranchal, Uttar Pradesh. (Malaysia: Perak; Philippines; Indonesia: Java, Lombok) (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from indet. mealybug on *Mangifera*

indica and *Anona squamosa* (present record for India).

16. *Gyranusoidea indica* Shafee, Alam and Agarwal

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 4 females, 24.vi.2008, ex. *Phenacoccus solenopsis* on *Hibiscus cannabinus* and *Hibiscus rosa-sinensis*, coll. T. Nalini ; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 5 females, 8.vii.2008, ex. *Phenacoccus solenopsis* on *Hibiscus mutabilis*, coll. T. Nalini; Cuddalore, Sivapuri (11°24' N 79°41' E, 5.79m), 2 females, 2.i.2010, ex. *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. T. Nalini.

Distribution: India: Bihar, Kerala, Uttar Pradesh, Tamil Nadu (Hayat, 2006).

Hosts: Recorded here from *Phenacoccus solenopsis* on *Hibiscus cannabinus*, *Hibiscus rosa-sinensis* and *Hibiscus mutabilis* (present record for India).

17. **Homalotylus albiclavatus* (Agarwal)

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 4 females, 15.ix.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. T. Nalini; Dindugal, Bathalagundu (10°09' N 78°20' E, +280.11 m), 1 female, 6.iv.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Cyamopsis tetragonolobus*, coll. A. Rameshkumar.

Distribution: India: Himachal Pradesh, Jharkhand, Karnataka, Kerala, Rajasthan, Tamil Nadu, Uttar Pradesh, West Bengal (Hayat, 2006).

Hosts: Recorded here from [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum* and *Cyamopsis tetragonolobus* (present record for India).

18. **Homalotylus eytelweinii* (Ratzeburg)

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 1 female, 18.viii.2008, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. T. Nalini; Coimbatore, Mettupalayam (11°30' N 76°95' E, 310m), 1 female, 2.iv.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. S. Manickavasagam; Perambalur, Chettikulam (10°09' N 77°07' E, 328.5 m), 1 female, 2.iii.2009, ex. [indet. Coccinellid predaceous on] *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. S. Manickavasagam; Trichy, Erakudi (11°30' N 78°50' E, 78 m), 2 females, 5.viii.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. A. Rameshkumar.

Distribution: India: Delhi, Himachal Pradesh, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh. (Palaeartic; probably cosmopolitan) (Hayat, 2006).

Hosts: Recorded here from [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum* and *Hibiscus rosa-sinensis* (present record for India).

19. **Homalotylus indicus* (Agarwal)

Specimens examined: India: Tamil Nadu, Cuddalore, Sivapuri (11°24' N 79°41' E, 5.79m), 1 female, 5.x.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. T. Nalini.

Distribution: India: Delhi, Kerala, Rajasthan, Tamil Nadu,

Uttar Pradesh (Hayat, 2006).

Hosts: Recorded here from [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum* (present record for India).

20. **Homalotylus turkmenicus* Myartseva

Specimens examined: India: Tamil Nadu, Trichy, Erakudi (11°30' N 78°50' E, 78 m), 2 females, 21.vii.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum*, coll. A. Rameshkumar; Trichy, Thuraiyur (11°09' N 78°36' E, 78 m), 2 females, 21.vii.2009, ex. [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Hibiscus rosa-sinensis*, coll. A. Rameshkumar.

Distribution: India: Haryana, Punjab, Rajasthan, Uttar Pradesh. (Palaeartic Turkmenistan; Iran) (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from [indet. Coccinellid predaceous on]: *Phenacoccus solenopsis* on *Gossypium hirsutum* and *Hibiscus rosa-sinensis* (present record for India).

21. *Leptomastix nigrocincta* Risbec

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 9 females, 26.vi.2008, ex. *Coccidohistrix* [= *Centroccoccus*] *insolita* on *Hibiscus rosa-sinensis* and *Solanum torvum*, coll. T. Nalini.

Distribution: India: Andaman and Nicobar islands, Andhra Pradesh, Delhi, Karnataka, Kerala, Madhya Pradesh, Tamil Nadu, Uttar Pradesh. (China; Madagascar) (Hayat, 2006).

Hosts: Recorded here from *Coccidohistrix* [= *Centroccoccus*] *insolita* on *Hibiscus rosa-sinensis* and *Solanum torvum* (present record for India).

22. *Mahencyrtus assamensis* Singh and Agarwal

Specimens examined: India: Tamil Nadu, Cuddalore, Therkumangudi (11°20' N 79°44' E, 6.5m), 2 females and 2 males, 1.viii.2009, ex. *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini; Nagapatinam, Kunnam (11°31' N 79°73' E, 13m), 2 females, 8.viii.2009, ex. *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini.

Distribution: India: Assam, Bihar, Haryana, Kerala, Uttar Pradesh (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from *Brevennia rehi* on *Oryza sativa* (present record for India).

23. *Neoplatycerus tachikawai* Subba Rao

Specimens examined: India: Tamil Nadu, Cuddalore, Chidambaram (11°40' N 79°70' E, 2.7 m), 3 females, 1.iii.2010, ex. *Rastrococcus iceryoides* on *Pongamia pinnata*, coll. A. Rameshkumar.

Distribution: India: Orissa, Uttaranchal, Uttar Pradesh (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here from *Rastrococcus iceryoides* on *Pongamia pinnata* (present record for India).

24. *Praleurocerus viridis* (Agarwal)

Specimens examined: India: Tamil Nadu, Trichy, Thuraiyur (11°09' N 78°36' E, 78 m), 3 females, 2.ix.2009, ex. *Rastrococcus iceryoides* on indet. weed, coll. A. Rameshkumar.

Distribution: India: Assam, Karnataka, Tamil Nadu, Uttaranchal, Uttar Pradesh. (Sri Lanka; Bangladesh) (Hayat, 2006).

Hosts: Recorded here from *Rastrococcus iceryoides* on indet. weed (present record for India).

25. **Prochiloneurus agarwali* Hayat

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 11 females, 25.vii.2009, ex. (with) *Phenacoccus solenopsis* on *Solanum melongena*, *Helianthus annuus*, *Abelmoschus esculentus*, *Acalypha indica* and *Gossypium hirsutum*, coll. T. Nalini; Nagapatinam, Sandhapadugai (11°20' N 79°44' E, 6.5m), 1 female, 27.vii.2009, ex. (with) *Phenacoccus solenopsis* on *Abelmoschus esculentus*. coll. T. Nalini; Coimbatore, Pudur (9°32' N 78°15' E, 58.8m), 1 female, 7.vi.2009, ex. (with) *Maconellicoccus hirsutus* on *Abelmoschus esculentus* coll. A. Rameshkumar.

Distribution: India: Andhra Pradesh (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here (with) *Phenacoccus solenopsis* on *Solanum melongena*, *Helianthus annuus*, *Abelmoschus esculentus*, *Acalypha indica* and *Gossypium hirsutum* (present record for India) and (with) *Maconellicoccus hirsutus* on *Abelmoschus esculentus*.

26. **Prochiloneurus albifuniculus* (Hayat, Alam and Agarwal)

Specimens examined: India: Tamil Nadu, Salem, Attur (11°60' N 78°62' E, 208.5m), 1 female, 4.x.2009, ex. (with) *Phenacoccus solenopsis* on *Abutilon indicum*, coll. A. Rameshkumar.

Distribution: India: Assam, Himachal Pradesh, Rajasthan, Uttar Pradesh (Hayat, 2006), Tamil Nadu (present record).

Hosts: Recorded here (with) *Phenacoccus solenopsis* on *Abutilon indicum* (present record for India).

27. * *Prochiloneurus comperei* Viggiani

Specimens examined: India: Tamil Nadu, Theni, Pudupatti (11°15' N 78°22' E, 149.4 m), 1 female, 2.ix.2009, ex. (with) indet. mealy bug on *Anona squamosa*, coll. A. Rameshkumar.

Distribution: India: Andhra Pradesh, Punjab, Tamil Nadu. (Tanzania; Eritrea; South Africa) (Hayat, 2006).

Hosts: Recorded here (with) indet. mealybug on *Anona squamosa* (present record for India).

28. **Prochiloneurus pulchellus* Silvestri

Specimens examined: India: Tamil Nadu, Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 1 female, 3.vii.2008, ex. (with) *Phenacoccus solenopsis* on *Anona squamosa*, coll. T. Nalini; Cuddalore, Annamalainagar (11°24' N 79°44' E, +5.79 m), 8 females and 4 males, 19.vii.2009, ex. (with) *Phenacoccus solenopsis* on *Hibiscus mutabilis* and *Hibiscus rosa-sinensis*, coll. T. Nalini; Dindugal, Kavarayanpatti (10°05' N 77°30' E, (+)280.11m), 1 female, 6.iv.2009, ex. (with) *Phenacoccus solenopsis* on *Solanum melongena*, coll. S. Manickavasagam; Trichy, Perumalpalayam (11°30' N 77°45' E, 79.5 m), 3 females, 21.vii.2009, ex. (with) *Coccidohistrix* [= *Centroccoccus*] *insolita* on *Solanum torvum*, coll. S. Manickavasagam.

Distribution: India: Andhra Pradesh, Bihar, Goa, Haryana, Karnataka, Kerala, Maharashtra, Punjab, Tamil Nadu, Uttar Pradesh. (Eritrea; South Africa) (Hayat, 2006).

Hosts: Recorded here (with) *Phenacoccus solenopsis* on

Anona squamosa, *Hibiscus mutabilis*, *Hibiscus rosa-sinensis* and *Solanum melongena* (present record for India) and (with) *Coccidohistrix* [= *Centroccoccus*] *insolita* on *Solanum torvum*.

29. *Rhopus nigroclavatus* (Ashmead)

Specimens examined: India: Tamil Nadu, Cuddalore, Therkumangudi (11°20' N 79°44' E, 6.5m), 1 female (on slide) and 2 males, 1.viii.2009, ex. *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini; Nagapatinam, Kunnam (11°31' N 79°73' E, 13m), 1 female (on slide), 24.vii.2009, ex. *Brevennia rehi* on *Oryza sativa*, coll. T. Nalini.

Distribution: India: Andhra Pradesh, Assam, Bihar, Delhi, Haryana, Himachal Pradesh, Karnataka, Kerala, Orissa, Pondicherry, Rajasthan, Tamil Nadu, West Bengal, Uttaranchal, Uttar Pradesh. (Hayat, 2006).

Hosts: Recorded here from *Brevennia rehi* on *Oryza sativa* (S. Raguraman *et al.*, 1991).

Mealybug, *Phenacoccus solenopsis* is commonly present in all districts surveyed along with its parasitoids which might be keeping it under check along with other mortality factors. The occurrence of *Brevennia rehi* on *Oryza sativa* is mainly due to water shortage in coastal districts like Cuddalore and Nagapattinam of Tamil Nadu especially in early seasons (June to September), as this tract receives rainfall mainly from North East monsoon. *Ferrisia virgata*, *Maconellicoccus hirsutus*, *Planococcus citri*, *Rastrococcus iceryoides* and *Coccidohistrix* [= *Centroccoccus*] *insolita* are predominantly parasitized by *Aenasius advena*, *Anagyrus kamali*, *Anagyrus chrysos*, *Praeurocerus viridis* and *Leptomastix nigrocincta* respectively. Thus the present survey has helped to identify hosts for several encyrtids which will be definitely helpful for future biocontrol research.

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